

(19) The Japanese Patent Office
 (12) Laid-Open Patent Application Publication (A)
 (11) Laid-Open Patent Application Publication No. P2000-172279A
 (43) Publication Date: June 23, 2000

(51)

Int. Cl. ⁷	Classification Symbol	F1	Subject code [Reference]
G10/K 15/04	302	G10/K 15/04	302D 5D108
G09/B 15/00		G09/B 15/00	D 5D378
G10/H 1/00	102	G10/H 1/00	102Z 9A001
G10/L 11/00		G10/L 11/00	D

Request for Examination: not yet requested

Number of Claims: 4 OL (6 pages in total)

(21) Application No. Hei-10-343986

(22) Application Date: December 3, 1998

(71) Applicant: 000004075

Yamaha Kabushiki Kaisha

No. 10-1, Nakazawa-cho, Hamamatsu-shi,
 Shizuoke-ken, Japan

(72) Inventor: Shuichi MATSUMOTO

c/o Yamaha Kabushiki Kaisha

No. 10-1, Nakazawa-cho, Hamamatsu-shi,
 Shizuoke-ken, Japan

(74) Agent: Patent Attorney, Hisao KOMORI, 100084548

(54) [Title of the Invention] KARAOKE SING-ALONG DEVICE

(57) [Abstract]

[Problem] To provide a karaoke sing-along device which can record the best vocal performance of a singer.

[Solution] A singer does a plurality of takes of a song in which his/her vocal sounds are recorded. All the sections of the

recorded sounds are graded. The music piece is divided into phrases, and the best take for each phrase is selected based on the results of the grading. The best takes selected for each phrase are connected to create the best vocal performance (recording take). The recording take is reproduced with effects such as echo added. The sound is then mixed with karaoke music sound without a guide melody and recorded onto a CD or MD to create a recording disc.

[Detailed Description of the Invention]

[0001]

[Field of the Invention]

The present invention relates to a karaoke sing-along device which can record vocal sound of a singer.

[0002]

[Related Art]

Karaoke sing-along devices are a device which plays karaoke music for a singer to sing along with. Some karaoke sing-along devices are provided with a device for recording the singer's vocal sound on a CD or the like.

[0003]

[Problem to be Solved by the Invention]

When the recording function of a conventional karaoke device is used, however, the singer's vocal sound has to be directly recorded at one time. Thus, the singer's vocal sound is recorded as it is even if the performance of the singer is not good.

[0004]

An object of the present invention is to provide a karaoke sing-along device which can record the best vocal performance of a singer.

[0005]

[Means for Solving the Problem]

The invention of Claim 1 comprises: karaoke sing-along music playing means for playing karaoke music; vocal sound recording means for recording vocal sound for one song a plurality of times; take selecting means for selecting one of the plurality of recorded sounds for each specific section of the vocal sound; and reconstructing means for reconstructing vocal sound by connecting the recorded sounds selected for each section.

[0006]

The invention of Claim 2 is the invention of Claim 1 further comprising grading means for grading vocal skills, in which the take selecting means selects recorded sound graded as the best for each section of the vocal sound.

[0007]

The invention of Claim 3 is the invention of Claim 1 or 2 further comprising: vocal sound reproducing means for reproducing the reconstructed vocal sound; recording karaoke music playing means for playing karaoke music in synchronization with the vocal sound; and recording means for mixing and recording the vocal sound and the karaoke music, in which the karaoke sing-along music playing means generates a guide melody or model vocal sound together with the karaoke music sound, and the recording karaoke music playing means generates only the karaoke music sound.

[0008]

The invention of Claim 4 is the invention of Claim 3, in which the vocal sound recording means records vocal sound without any effects such as echo added, and the recoding means records vocal sound with effects added.

[0009]

[Embodiment of the Invention]

Description will be hereinafter made of an embodiment of the present invention with reference to the drawings. Fig. 1 is a block diagram of a karaoke sing-along device of this invention in the recording mode. Fig. 2 is a block diagram of the karaoke sing-along device in the editing/reproducing mode. Fig. 3 is a block diagram of the karaoke sing-along device in the medium writing mode. That is, the karaoke sing-along device of this invention has a recording function in addition to the ordinary playing mode function, and proceeds during recording from the recording mode to the editing/reproducing mode to the medium writing mode.

[0010]

As shown in Fig. 1, a sequencer 2 reads karaoke music data 1 in accordance with tempo and inputs the data into a sound source 3. The sound source 3 generates music sound based on the data. The generated music sound is inputted into an amplifier 9. The karaoke music sound inputted into the amplifier 9 is outputted from a headphone 10. That is, in the recording mode of the recording function, only vocal sound is inputted into a microphone 6 and the music sound and so on are outputted from the headphone 10 so that the microphone 6 may not pick up the music sound. A singer puts on the headphone 10 and sings into the microphone 6.

[0011]

The karaoke music data include a guide melody track for generating a guide melody for karaoke singing and a phrase data track indicating breaks between phrases of the karaoke music sound in addition to a music sound track for causing the sound source 3 to play the karaoke music. In the recording mode, the sequencer 2 reads the music sound track, the guide melody track and the phrase data track, and inputs data from the music sound track and the guide melody track into the sound source 3 to cause

it to play the karaoke music. The sound source 3 generates both the karaoke music sound and the guide melody. Thus, the singer can sing while listening to the guide melody in addition to the karaoke music sound through the headphone.

[0012]

The guide melody may not be read (generated) when the singer selects that option.

[0013]

The singing microphone 6 is preferably a stand microphone or a hanging microphone which cause less noise than a hand microphone.

[0014]

An effector 7 adds proper effects such as echo to the vocal sound inputted through the microphone 6. The vocal sound is then inputted into the amplifier 9 and outputted through the headphone 10. The vocal sound is also inputted into a grading section 8 and a recording section 4.

[0015]

The recording section 4 stores the vocal sound in a vocal sound storing section 5. The vocal sound storing section 5 can record vocal sound for one karaoke song up to three times. The vocal sounds are stored as "Take 1," "Take 2" and "Take 3." The vocal sounds to be recorded in the vocal sound storing section 5 are dry sounds without any effects added, so that the vocal sounds can be easily compared between the takes and easily edited.

[0016]

The sequencer 2 inputs into the recording section 4 a time code as a code for synchronizing the vocal sound with the phrase data and the karaoke music sound during karaoke music performance, and inputs into the grading section 8 the guide melody data as reference data for grading. The grading section 8 grades the inputted vocal sound by comparing it with the

reference data. The grading section 8 grades the vocal sound in terms of pitch, volume and rhythm as has been done conventionally. Such techniques are described in detail in Japanese Patent Application No. Hei 8-233189 and Japanese Patent Application No. Hei 8-233190. Point data as the results of the grading are inputted into the recording section 4. The recording section 4 stores the time code, the phrase data and the point data together with the vocal sound. In the recording mode, the identical karaoke music is played three times in sequence and the vocal sounds at those times are recorded as "Take 1," "Take 2" and "Take 3."

[0017]

When the three recordings are completed in the recording mode, the karaoke sing-along device proceeds to the editing/reproducing mode. Before proceeding to the editing/reproducing mode, the recorded vocal sounds may be optionally played back so that the singer can determine which take is the best by himself/herself.

[0018]

In the editing/reproducing mode, the best take is selected for each phrase from the vocal sounds (Take 1 to Take 3) recorded in the recording mode and the selected sounds are connected to create a recording take. As shown in Fig. 2, the sequencer 2 reads the same karaoke music data 1 as those read in the recording mode and inputs the data into the sound source 3. The sequencer 2 reads only data from the accompaniment track and does not read those from the guide melody track in this editing/reproducing mode and the medium recording mode, while it reads data from the guide melody track together with those from the music sound track in the recording mode. The sound source 3 generates music sound based on the data. The generated music sound is inputted into the amplifier 9.

[0019]

The sequencer 2 outputs the time code to a selective reading section 11 in parallel with the playing of the karaoke music. The selective reading section 11 reads one of the vocal sounds (one of the Take 1 to Take 3) in synchronization with the time code. At this time, the selective reading section 11 selects and reads for each phrase the take with the highest grading point as the best take.

[0020]

Fig 4 shows the manner of selection. When a switch is made from one take to another at breaks between phrases as shown in the drawing, the vocal sounds are cross-faded so that the waveform of the resulting vocal sound may not be discontinuous. The thus synthesized vocal sound of the recording take is inputted into a reproducing section 12 and a recording section 13. The reproducing section 12 demodulates the vocal sound of the recording take into an audio signal and inputs the audio signal into the effector 7. The effector 7 adds proper effects to the vocal sound and inputs it into the amplifier 9. The amplifier 9 mixes the vocal sound and the karaoke music sound and outputs the mixed sound through a loudspeaker 17.

[0021]

The recording section 13 stores the inputted vocal sound of the recording take in a recording take storing section 14.

[0022]

In the above description, the selective reading section 11 makes the selection of the takes for each phrase based on the points as the results of grading. However, when the singer operates an operating section 15 to designate one of the takes, the selective reading section 11 selects the designated take irrespective of the points. One example of the method for designating a take is as follows.

[0023]

After the recording mode is completed, the takes are played back before the editing/reproducing mode is started. The singer listens to the playbacks and presses a selection button at the moment when he/she thinks that he/she was singing well. When the button is pressed, button-on information is added to the point information for the phrase of the take which is now being played back. When the takes are compared in the editing/reproducing mode, the take with the button-on information is preferentially selected.

[0024]

In this embodiment, data indicating breaks between phrases are included in the music sound data. However, breaks between phrases may be determined based on the changes in volume of the vocal sound indicated by the guide melody data or may be determined mechanically at regular intervals. When the phrases are separated at breaks in the vocal sound, the takes can be connected naturally.

[0025]

Fig. 3 is a block diagram of the karaoke sing-along device in the medium writing mode. In this mode, the vocal sound stored as the recording take is written onto a medium such as a CD or MD. The sequencer 2 reads the karaoke music data 1 and inputs the data into the sound source 3. The data which are read at this time are the data from the music sound track alone. The sound source 3 generates karaoke music sound based on the data. As described above, the guide melody is not generated. The generated music sound is inputted into the amplifier 9.

[0026]

A reading and reproducing section 20 receives the time code from the sequencer 2, reads the recording take from the recording take storing section 14 in synchronization with the

time code, and demodulates it into an audio signal. The vocal sound is inputted into the effector 7. The effector 7 adds proper effects to the vocal sound and inputs it into the amplifier 9. The amplifier 9 mixes the vocal sound and the karaoke music sound and outputs the mixed sound through the loudspeaker 10. At the same time, the amplifier 9 outputs the mixed sound to a medium writing section 21. The medium writing section 21 converts the audio signal to data suitable for a medium set in the device and writes the data onto the medium.

[0027]

The vocal sound of the best take with proper effects added and the music sound without a guide melody can be thereby mixed with each other and recorded on a medium such as a CD or MD.

[0028]

In the above embodiment, the grading is conducted when the takes have been recorded. However, the grading of the takes may be conducted on a different occasion or in the early stage during the editing/reproducing mode.

[0029]

The karaoke music data may include a model vocal as a (digitalized) audio signal instead of the guide melody track.

[0030]

[Effects of the Invention]

According to the invention of Claim 1, one karaoke song is recorded a plurality of times and the best recorded sounds selected for each section (phrase) are connected to reconstruct one vocal sound. Thus, the best performance, not a vocal sound taken at a time, can be recorded.

[0031]

According to the invention of Claim 2, vocal skills of a singer are graded by the grading means, and the best recorded sounds

with the highest points are selected. Thus, the best vocal performance can be automatically reconstructed.

[0032]

According to the invention of Claim 3, karaoke music sound with a guide melody is played when the singer sings so that the singer can sing with ease, and karaoke music sound without a guide melody is played at the final recording so that the vocal sound can be heard more clearly. Thus, the vocal sound can be recorded in a manner to make it sound better.

[0033]

According to the invention of Claim 4, dry vocal sounds are recorded at initial recordings (takes) so that the skills of the singer can be easily determined and the vocal sounds can be easily edited, and a vocal sound with effects added is recorded at the final recording. Thus, the selection and editing of vocal sounds can be made easily and the vocal sound can be recorded in a manner to make it sound better.

[Brief Description of the Drawings]

Fig. 1 is a functional block diagram of a karaoke sing-along device according to an embodiment of the present invention. Fig. 2 is a functional block diagram of the karaoke sing-along device.

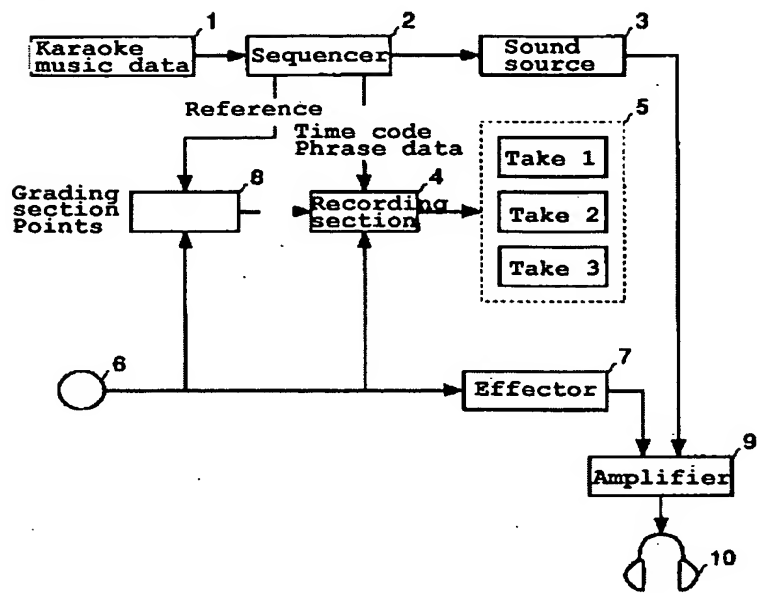
Fig. 3 is a functional block diagram of the karaoke sing-along device.

Fig. 4 is a diagram illustrating the manner of creating the best take.

[Description of Reference Numerals]

- 1: music sound data
- 2: sequencer
- 3: sound source
- 4: recording section
- 5: storing section

6: singing microphone
7: effector
8: amplifier
14: reproducing section
16: selecting device
20: pitch extracting section
21: selector
22: recording section
23: storing section
25: MD recording section



Vocal sound				
Time code				
			Phrase data	
			Point data	

FIG. 1

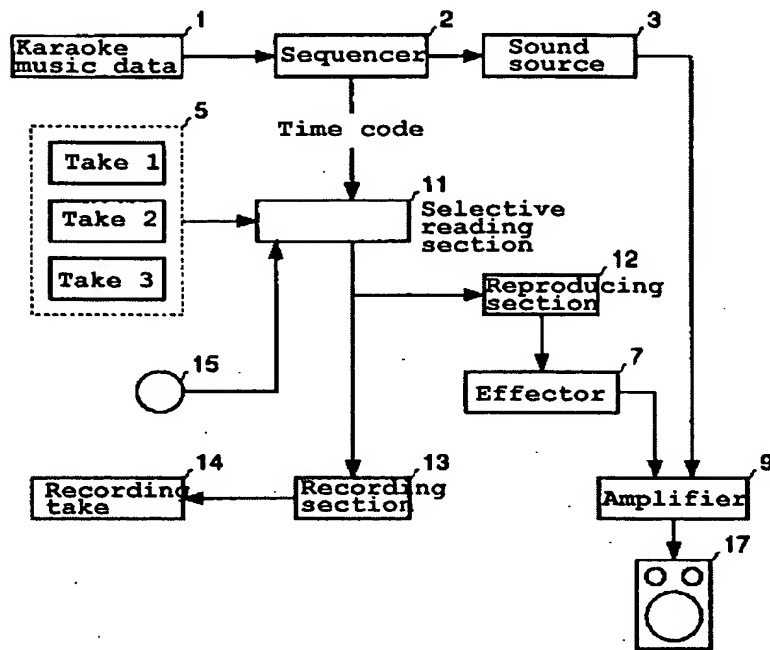


Fig. 2

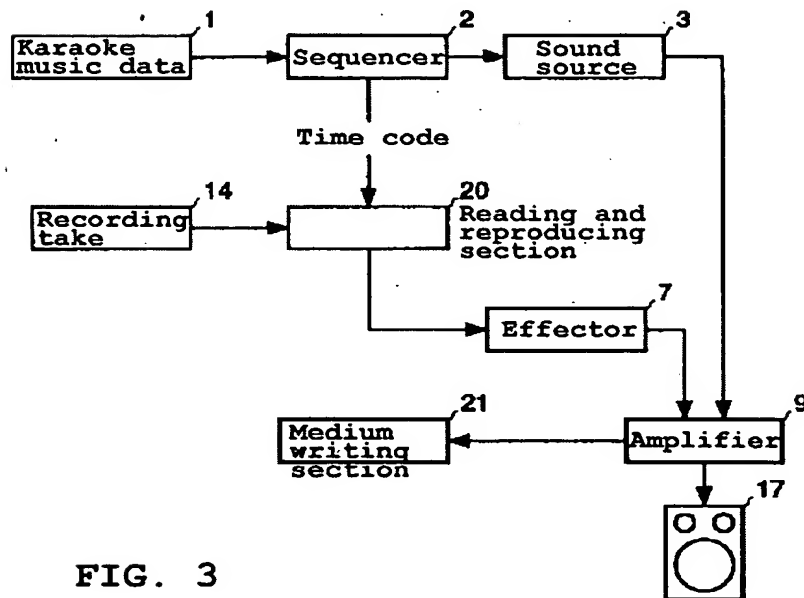


FIG. 3

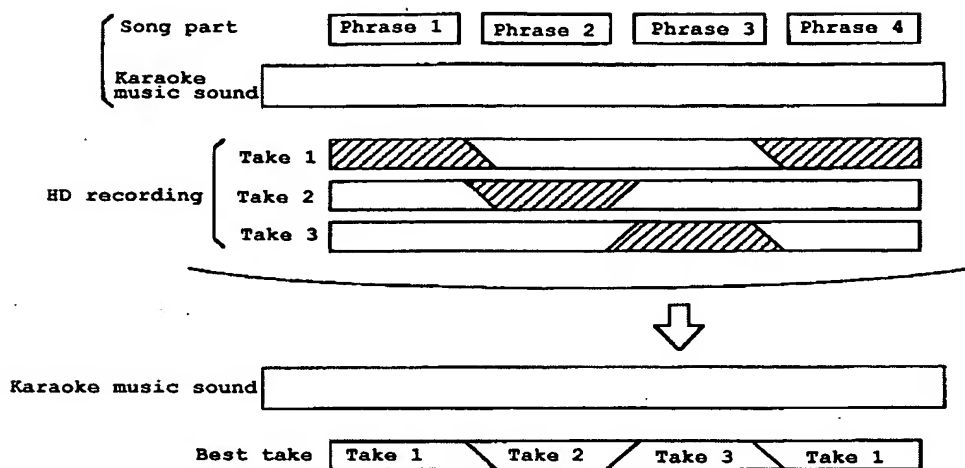


FIG. 4

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☐ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☒ FADED TEXT OR DRAWING
- ☒ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.